

Amendments to the Claims

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1-60 (Cancelled).

61 (Previously Presented). A method for transfecting a cell with a nucleic acid molecule comprising contacting said cell with a sphingoid-polyalkylamine conjugate together with said nucleic acid molecule, wherein said sphingoid-polyalkylamine conjugate comprises a sphingoid backbone carrying, via a carbamoyl bond, at least one polyalkylamine.

62 (Previously Presented). The method of Claim 61, wherein said nucleic acid is associated with said sphingoid-polyalkylamine conjugate.

63 (Previously Presented). The method of Claim 61, wherein said nucleic acid molecule is a plasmid DNA.

64 (Previously Presented). The method of Claim 61, wherein said nucleic acid molecule is a small interference RNA (siRNA).

65 (Previously Presented). The method of Claim 61, wherein said nucleic acid molecule is an oligodeoxynucleotide (ODN).

66 (Previously Presented). The method of Claim 62, wherein said sphingoid-polyalkylamine conjugate forms lipid assemblies.

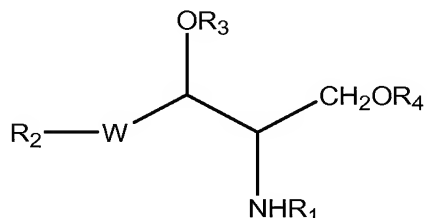
67 (Previously Presented). The method of Claim 66, wherein said sphingoid-polyalkylamine conjugate forms vesicles, micelles or a mixture of same.

68 (Previously Presented). The method Claim 61, wherein the sphingoid backbone is selected from ceramide, dihydroceramide, phytoceramide, dihydrophytoceramide, ceramine, dihydroceramine, phytoceramine, dihydrophytoceramine.

69 (Previously Presented). The method of Claim 61, wherein said sphingoid backbone is a ceramide.

70 (Previously Presented). The method of Claim 61, wherein said one or more polyalkylamine chains are independently selected from spermine, spermidine, a polyalkylamine analog or a combination thereof.

71 (Currently Amended). The method of Claim 61, wherein said sphingoid-polyalkylamine conjugate has the following formula (I):



wherein

R₁ represents a hydrogen, a branched or linear alkyl, aryl, alkylamine, or a group -C(O)R₅;

R₂ and **R₅** represent, independently, a branched or linear C₁₀-C₂₄ alkyl, alkenyl or polyenyl ~~groups~~ group;

R₃ and **R₄** are, independently, a group -C(O)-NR₆R₇, in which **R₆** and **R₇**, being the same or different for **R₃** and **R₄**, ~~and~~ represent, independently, a hydrogen, or a saturated or unsaturated branched or linear polyalkylamine, wherein one or more amine units in said polyalkylamine may be a quaternary ammonium; or **R₃** is a hydrogen; or **R₃** and **R₄** form, together with the oxygen atoms to which they are bound, a heterocyclic ring comprising -C(O)-NR₉-[R₈-NR₉]_m-C(O)-, in which **R₈** represents a saturated or unsaturated C₁-C₄ alkyl and **R₉** represents a hydrogen or a polyalkylamine of the formula -[R₈-NR₉]_n-, wherein said R₉ or each alkylamine unit -R₈NR₉ may be the same or different in said polyalkylamine; and **n** and **m**, ~~represent~~, independently, an integer from 1 to 10; and

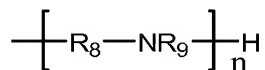
W represents a group selected from -CH=CH-, -CH₂-CH(OH)- or -CH₂-CH₂-.

72 (Previously Presented). The method of Claim 71, wherein **R₁** represents a -C(O)R₅ group, R₅ being as defined.

73 (Previously Presented). The method of Claim 71, wherein said **R₂** and **R₅** represent, independently, a linear or branched C₁₂-C₁₈ alkyl or alkenyl chain.

74 (Previously Presented). The method of Claim 71, wherein **W** represents -CH=CH-.

75 (Currently Amended). The method of Claim 71, wherein **R₁** represents a -C(O)R₅ group; **R₅** represents a C₁₂-C₁₈ linear or branched alkyl or alkenyl; **W** represents -CH=CH-; **R₂** represents a C₁₂-C₁₈ linear or branched alkyl or alkenyl; **R₃** and **R₄** represent, independently, a group -C(O)-NR₆R₇, and **R₃** may also represent a hydrogen, wherein **R₆** and **R₇** represent, independently, a hydrogen or a polyalkylamine having the general formula (II):



wherein

R₈ represent a C₁-C₄ alkyl;

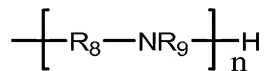
R₉ represents a hydrogen or a polyalkylamine branch of formula (II), said **R₈** and **R₉** may be the same or different for each alkylamine unit, -**R₈****NR₉**-, in the polyalkylamine of formula (II); and

n represents an integer from 3 to 6.

76 (Previously Presented). The method of Claim 71, wherein **R₃** is a hydrogen atom.

77 (Previously Presented). The method of Claim 71, wherein both **R₃** and **R₄** represent the same or different polyalkylamine.

78 (Currently Amended). The method of Claim 71, wherein **R₁** represents a -C(O)**R₅** group; **R₅** represents a C₁₂-C₁₈ linear or branched alkyl or alkenyl; **W** represents -CH=CH-; **R₂** represents a C₁₂-C₁₈ linear or branched alkyl or alkenyl; **R₃** and **R₄** represent, independently, a group -C(O)-**NR₆****R₇**, wherein **R₆** and **R₇** represent, independently, an alkylamine or a polyalkylamine having the general formula (II):



wherein

R₈ represent a C₁-C₄ alkyl;

R₉ represents a hydrogen or a polyalkylamine branch of formula (II), said **R₈** and **R₉** may be the same or different for each alkylamine unit, -**R₈****NR₉**-, in the polyalkylamine of formula (II); and

n represents an integer from 3 to 6.

79 (Currently Amended). The method of Claim 71, wherein **R**₁ represents a -C(O)R₅ group; **R**₅ represents a C₁₂-C₁₈ linear or branched alkyl or alkenyl; **W** represents -CH=CH-; **R**₂ represents a C₁₂-C₁₈ linear or branched alkyl or alkenyl; **R**₃ and **R**₄ form, together with the oxygen atoms to which they are bonded, a heterocyclic ring comprising -C(O)-[NH-R₈]_n-NH-C(O)-,

wherein

R₈ represents a C₁-C₄ alkyl, wherein for each alkylamine unit -NH-R₈-, said R₈ may be the same or different; and

n represents an integer from 3 to 6.

80 (Previously Presented). The method of Claim 71, wherein said R₈ is a C₃-C₄ alkyl.

81 (Previously Presented). The method of Claim 71, wherein said sphingoid-polyalkylamine conjugate is N-palmitoyl D-erythro sphingosyl-1-carbamoyl spermine (CCS).

82 (Previously Presented). The method of Claim 61, wherein said sphingoid-polyalkylamine conjugate associated with the nucleic acid molecule is also associated with a targeting substance.

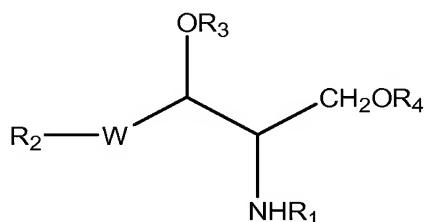
83 (Canceled).

84 (Withdrawn). A method for the treatment of a disease or disorder, the method comprises providing a subject in need of said treatment an amount of a sphingoid-polyalkylamine conjugate associated with a nucleic acid molecule, wherein said sphingoid-polyalkylamine conjugate comprises a sphingoid backbone carrying, via a carbamoyl bond, at least one polyalkylamine and the amount

of said nucleic acid molecule is effective to achieve a desired biochemical effect once in said target cell.

85 (Withdrawn). The method of Claim 84, wherein said sphingoid backbone is ceramide.

86 (Withdrawn/Currently Amended). The method of Claim 84, wherein said sphingoid-polyalkylamine conjugate has the following formula (I):



wherein

R₁ represents a hydrogen, a branched or linear alkyl, aryl, alkylamine, or a group -C(O)R₅;

R₂ and **R**₅ represent, independently, a branched or linear C₁₀-C₂₄ alkyl, alkenyl or polyenyl ~~group~~ group;

R₃ and **R**₄ are independently a group -C(O)-NR₆R₇, in which **R**₆ and **R**₇ being the same or different for R₃ and R₄, ~~and~~ represent, independently, a hydrogen, or a saturated or unsaturated branched or linear polyalkylamine, wherein one or more amine units in said polyalkylamine may be a quaternary ammonium; or **R**₃ is a hydrogen; or **R**₃ and **R**₄ form, together with the oxygen atoms to which they are bound, a heterocyclic ring comprising -C(O)-NR₉-[R₈-NR₉]_m-C(O)-, in which **R**₈ represents a saturated or unsaturated C₁-C₄ alkyl and **R**₉ represents a hydrogen or a polyalkylamine of the formula -[R₈-NR₉]_n-, wherein said R₉ or each alkylamine unit -R₈NR₉ may be the

same or different in said polyalkylamine; and **n** and **m**, represent, independently, an integer from 1 to 10; and

W represents ~~a group selected from~~ -CH=CH-, -CH₂-CH(OH)- or -CH₂-CH₂-.

87 (Withdrawn). The method of Claim 84, wherein said sphingoid-polyalkylamine conjugate is N-palmitoyl D-erythro sphingosyl carbamoyl-spermine (CCS).

88 (Withdrawn). A transfection composition comprising: a sphingoid-polyalkylamine conjugate comprising a sphingoid backbone carrying, via a carbamoyl bond, at least one polyalkylamine; and a nucleic acid molecule.

89 (Withdrawn). The transfection composition of Claim 88, comprising a physiologically acceptable carrier.

90 (Withdrawn). The transfection composition of Claim 88, wherein said nucleic acid molecule has, at a physiological pH, a net negative dipole moment, at least one area carrying a negative charge or a net negative charge.

91 (Withdrawn). The transfection composition of Claim 88, wherein said nucleic acid molecule is a plasmid DNA.

92 (Withdrawn). The transfection composition of Claim 88, wherein said nucleic acid molecule is a small interference RNA (siRNA).

93 (Withdrawn). The transfection composition of Claim 88, wherein said nucleic acid molecule is an oligodeoxynucleotide (ODN).

94 (Withdrawn). The transfection composition of Claim 88, wherein the sphingoid-polyalkylamine conjugate forms lipid assemblies.

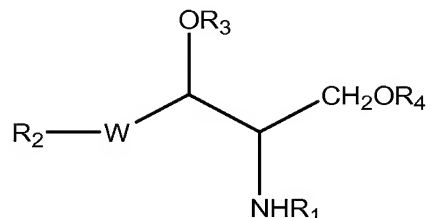
95 (Withdrawn). The composition of Claim 94, wherein the sphingoid-polyalkylamine conjugate forms vesicles and/or micelles.

96 (Withdrawn). The transfection composition of Claim 88, wherein the sphingoid backbone is selected from ceramide, dihydroceramide, phytoceramide, dihydrophytoceramide, ceramine, dihydroceramine, phytoceramine, dihydrophytoceramine.

97 (Withdrawn). The transfection composition of Claim 94, wherein said sphingoid is a ceramide.

98 (Withdrawn). The transfection composition of Claim 88, wherein said one or more polyalkylamine chains are independently selected from spermine, spermidine, a polyalkylamine analog or a combination thereof.

99 (Withdrawn/Currently Amended). The transfection composition of Claim 88, wherein said sphingoid-polyalkylamine conjugate has the following formula (I):



wherein

R₁ represents a hydrogen, a branched or linear alkyl, aryl, alkylamine, or a group -C(O)R₅;

R₂ and **R**₅ represent, independently, a branched or linear C₁₀-C₂₄ alkyl, alkenyl or polyenyl ~~groups~~ group;

R₃ and **R**₄ are, independently, a group -C(O)-NR₆R₇, in which **R**₆ and **R**₇, being the same or different for R₃ and R₄, ~~and~~ represent, independently, a hydrogen, or a saturated or unsaturated branched or linear polyalkylamine, wherein one or more amine units in said polyalkylamine may be a quaternary ammonium; or **R**₃ is a hydrogen; or **R**₃ and **R**₄ form, together with the oxygen atoms to which they are bound, a heterocyclic ring comprising -C(O)-NR₉-[R₈-NR₉]_m-C(O)-, in which **R**₈ represents a saturated or unsaturated C₁-C₄ alkyl and **R**₉ represents a hydrogen or a polyalkylamine of the formula -[R₈-NR₉]_n-, wherein said R₉ or each alkylamine unit -R₈NR₉ may be the same or different in said polyalkylamine; and **n** and **m**, represent, independently, an integer from 1 to 10; and

W represents ~~a group selected from~~ -CH=CH-, -CH₂-CH(OH)- or -CH₂-CH₂-.

100 (Withdrawn). The transfection composition of Claim 88, wherein said sphingoid- polyalkylamine conjugate is N-palmitoyl D-erythro sphingosyl carbamoyl-spermine (CCS).

101-106 (Canceled).